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The Prevalence of Missed Opportunities for Immunization among Children Utilizing Immunization Services In NNAMDI AZIKIWE University Teaching Hospital, NNEWI

Ubajaka F.C.[1], Ukegbu A.U.[2]*, Okafor N.J.[1], Ejiofor O.[3]
1. Department of Community Medicine, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, Nigeria.
2. Department of Community Medicine, Federal Medical Centre, Umuahia, Abia State, Nigeria.
3. Department of Paediatrics, Anambra State University Teaching Hospital, Amaku, Anambra State, Nigeria.
* E-mail of the corresponding author: andyukegbu@yahoo.com

Abstract

Immunization remains the most important and cost effective public health strategy for disease prevention. However, routine immunization coverage in Nigeria has continued to fall below average. Missed opportunities are one of the obstacles to raising immunization coverage among children, leading to resurgence of vaccine preventable diseases. This study was to determine the prevalence of missed opportunities for immunization against the eight diseases listed in the national programme on immunization (NPI) schedule and the associated factors in Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria. This was a cross sectional study involving 307 mother-neonate pairs attending the immunization clinic of Nnamdi Azikiwe Teaching Hospital, Nnewi between April and June 2010. The participants were recruited consecutively and interviewed with a semi-structured self-administered questionnaire. Most mothers (70.0%) had good knowledge of immunization and their main sources of information were the antenatal clinic (57.3%) and the media (27.0%). Their perception of immunization services in the teaching hospital was generally good (93.2%). The prevalence of missed opportunities for immunization was about 17%. Lack of vaccine(s), visit of client on a wrong day and vaccine not opened because of few clients were the major reasons for non-immunization, accounting for 44.2%, 36.6% and 15.4% respectively. The commonest vaccines missed were those given at birth and six weeks of age (BCG, OPV0, OPV1, HBV1 and DPT1). Mothers Age , education and knowledge of immunization were not significantly associated with missed opportunities. The identified reasons for missed opportunities in this study seem to be associated with the health facility. These should be addressed through adequate communication between mothers and health workers, training of health workers and policy flexibility.
Keywords: missed opportunity, immunization, teaching hospital, Nnewi, Nigeria.

1. Introduction

Immunization describes the whole process of delivering a vaccine and the immunity it generates in an individual and population (UNICEF 2009). It remains the most cost effective and important public health strategy for disease prevention. Preventable infectious diseases such as tuberculosis, poliomyelitis, diphtheria, tetanus and measles are the main causes of morbidity and mortality in children especially in developing countries like Nigeria.

The expanded programme on immunization (EPI) in middle and low income countries has prevented more than two million child deaths from these diseases since its initiative in 1974 (WHO/UNICEF 2005). Nigeria adopted the programme in 1979, and later renamed it National Programme on Immunization (NPI) as a way of promoting national consciousness and ownership of the programme. In 2004, the country included hepatitis B and yellow fever vaccines in its immunization schedule (Table 1). Since then the country has progressively demonstrated the political will in strengthening the health system and routine immunization services particularly to reduce the burden of vaccine preventable diseases, but success towards achieving the target of having 80% or above of children fully immunized is still a problem.

The coverage in many parts of Nigeria falls below 50% (Kunle-Olowu et al 2011; Antai 2009; Abdulraheem et al 2011). Identified reasons for low coverage rates are mothers' poor knowledge of immunization against targeted diseases, parents' concern about immunization safety, long waiting time at the health facility and long distance from the hospital (Abdulraheem et al 2011; Mackawa et al 2007). Apart from these problems, false contraindications like catarrh and mild fever in the child at the time of immunization, failure to administer simultaneously all vaccines for which the child was eligible and lack of information on the vaccination regimen are reported causes of missed opportunities to immunize in Nigeria (Onyiriuka et al 2005; Anah et al 2006; Kabir et al 2004; Adeiga et al 2006).

Missed opportunities are an obstacle to raising immunization coverage among children leading to resurgence of diseases such as tuberculosis, measles and poliomyelitis with high rates of infant mortality and frequent hospital admissions and increased demand on the available health facilities.
Missed opportunities for immunization is said to have occurred when a partially or non-immunized child misses the benefit of getting immunization during a visit to a health facility for an illness or check up when there is no absolute contraindication for that particular immunization as per national policy (Sato 1988).
The objective of this study was to determine the prevalence of missed opportunities for immunization against the eight diseases listed in the NPI schedule and the associated factors amongst children utilizing immunization services at Nnamdi Azikiwe University Teaching Hospital, Nnewi.

2. Materials and methods

2.1 Study setting

The study was conducted at the immunization clinic of Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi. The hospital is located at the heart of Nnewi, a sub-urban city with a flourishing automobile market. It has an estimated population of 391,227 people (Federal Republic of Nigeria 2007) and stands as the second largest city in Anambra state, South Eastern Nigeria.
The immunization clinic of the hospital is operated three times a week and is well attended because of its location, space and quality of services rendered, including growth monitoring and health education. About 173 children are immunized every month in the facility.

2.2 Study population

The study population included mothers attending the immunization clinic whose children were within the age of 0-12months.

2.3 Study design

A descriptive cross sectional study was carried out for three months, April to June 2010.

2.4 Sample size determination

A minimum sample size for the study was determined using the formula

$$n=\frac{z^2pq}{d^2}$$

Where n=minimum sample size
z=confidence limit for the study (1.96)
p= prevalence of missed opportunities for immunization (report of a study done in Mozambique gave 25.7%) or 0.257 (Jagretti et al 2008)
q= 1-p = 74.3% or 0.743
d= degree of precision (0.05)

$$n=\frac{(1.9)^2\,(0.257)(0.743)}{0.0025}=\frac{3.8416\times0.257\times0.743}{0.0025}$$

n=293

The calculated minimum size was 293. However, this was increased to 307 to make provision for attrition.

2.5 Sample selection

All consecutive mothers who attended the immunization clinic during the period of study and gave consent to participate in the study were recruited until the required sample size of 307 was obtained.

2.6 Data collection and analysis

The study instrument was a semi-structured self-administered questionnaire. Information was sought on mother's socio-demographic characteristics, knowledge and attitude about immunization. In addition, vaccines missed by the child and reasons for non-vaccination were elicited and validated with immunization cards (where available). The children were also examined for BCG scar on their arm. For the purpose of this study, a missed opportunity for immunization was described as a situation whereby a child visited a health facility and did not receive vaccine(s) for which he or she was eligible. Knowledge of mothers about immunization was assessed using ten tested questions scored on a three-point scale. Each correct answer was scored one point while a wrong answer was scored zero. Scores of 0-2, 3-5, and 6-10 were graded poor, average, and good respectively.
Data obtained was analysed using SPSS version 15. Associations between variables were measured using χ^2 with 5% significant level.

3. Results

Three hundred and seven mothers were studied. Majority, 291(94.79%) were within the age range of 21-40years. About 95% were married and more than half (58%) had secondary education. They were mostly traders (43.3%) and civil servants (21.3%) (Table 2).

The distribution of the respondents according to their knowledge about immunization is shown in Table 3. Most mothers 215(70.0%) had good knowledge, 63(20.5%) average knowledge, and 29(9.5%) poor knowledge about immunization.

Their main sources of information about immunization were antenatal clinic (57.3%), media (27.0%) and school (12.9%) (Table 4).

As shown in Table 5, the mothers' perception about immunization services in the teaching hospital was generally good (93.2%). However, about 16.9% of infants had missed opportunities for immunization (figure1). Lack of vaccine(s), visit on a wrong day and vaccine not opened because of few clients were the major reasons for missed opportunities, accounting for 44.2%, 34.6% and 15.4% respectively (figure 2).The distribution of vaccines missed is as shown in Table 6. The commonest vaccines missed were OPV1, HBV1 and DPT1 (40.38%), followed by BCG and OPVo (38.46%), and OPV2, HBV2, and DPT2 (11.54%). Mother's age, education and knowledge of immunization showed no significant association with missed opportunities for immunization ($p>0.05$) as shown in Tables 7, 8 and 9.

4. Discussion

The over all prevalence of missed opportunities in this study was 16.9%. This is lower compared to those reported in Benin City (27.6%) (Onyiriuka 2005) and Calabar (39.1%) (Anah et al 2006). It is also lower than 57.1% reported in India. This may be an indication of the quality of immunization services offered at the health facility, which the mothers perceived as good. The good knowledge of immunization by the mothers may have also contributed to the low rate of missed opportunities. Several reports have shown that negative perceptions about a health facility and poor knowledge about immunization by mothers were major barriers to childhood immunization (Onyiriuka 2005; Coreil et al 1989; Milman 1993).

The most outstanding reason for missing scheduled immunization in this study was lack of vaccine(s) (44.2%).Other researchers have also reported similar findings (Anah et al 2006; Kabir et al 2004; Adeiga et al 2006; Sadoh and Eregie 2009). Occasionally, vaccines may not be available in the health facilities due to logistic problems and poor distribution networks. However, the lack of vaccines as noted may be due to the inability of the health facility staff to forecast properly the vaccine needs of the centre, since there was no report of vaccine shortage in the country during the period of the study. The other reasons that stood out next to lack of vaccines were the visit of the child on a wrong day (34.6%) and vaccine not opened because of few clients (15.4%). Hutchins et al (1993) in a review of studies of missed opportunities for immunization in developing and industrialized countries noted that failure to open a multi-dose vaccine vial for a small number of persons to avoid vaccine wastage, and logistical problems were some of the reasons for missed opportunities. In the NnamdiAzikiwe University Teaching Hospital, infants who visited on a day immunization is not scheduled go back home without taking the vaccines for which they are due for that day. Refusal to vaccinate on an unscheduled day may increase the mothers' total cost of transportation, thus dampening their enthusiasm to attend vaccination clinics (Onyiriuka 2005) and cause loss of confidence in the immunization system. Health care providers should spend more time to communicate to mothers on immunization schedules and have constant training on vaccine management. In addition, there should be relaxation of the wastage allowances so that the health workers can open a new vial of vaccine for fewer children.

The most common vaccines missed were BCG, OPVo, OPV1, HBV1 and DPT1. It is noteworthy these vaccines are the ones given at birth and six weeks. This finding is in contrast with the study done in Calabar where measles vaccine given at nine months of age was the commonest missed (Anah et al 2006). Babies delivered at NAUTH, Nnewi receive BCG and OPVo before they are discharged. It is therefore likely that most of these infants were delivered outside NAUTH and present weeks after for immunization, and probably on the day it was not scheduled, which made them stand the chance of missing the immunization. This study however did not explore the place of birth of these infants. A study carried out in Benin reported that about 30% of children presented after four weeks of age for their first immunization (Sadoh and Eregie 2009).

5. Conclusion

The prevalence of missed opportunities for immunization in the hospital is low, but the main reasons seem to be facility based. The identified reasons should be addressed through bridging of communication gaps

between mothers and health workers, frequent training of health workers on vaccine management and relaxation of policy on vaccine wastage allowances.

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Table 1: Immunization schedule according to the national programme on immunization (NPI)

Vaccines	**Time of Administration**
BCG, OPV0	At birth
OPV1, HBV1, DPT1	6 weeks
OPV2, HBV2, DPT2	10 weeks
OPV3, HBV3, DPT3	14 weeks

Table 2: Distribution of respondents according to their socio-demographic characteristics

Age(years)	Number	Percentage
≤20	9	2.93
21-30	173	56.35
31-40	118	38.44
41-50	7	2.28
Total	**307**	**100.00**
Marital status		
single	9	2.93
married	292	95.12
widowed	6	1.95
Total	**307**	**100.00**
Occupation		
Trader	133	43.32
Civil servant	66	21.30
Artisan	34	11.08
Housewife	56	18.24
Student	18	5.86
Total	**307**	**100.00**
Educational status		
Primary	22	7.17
Secondary	178	57.98
Tertiary	102	33.22
None	5	1.63
Total	**307**	**100.00**

Table 3: Distribution according to graded knowledge about immunization

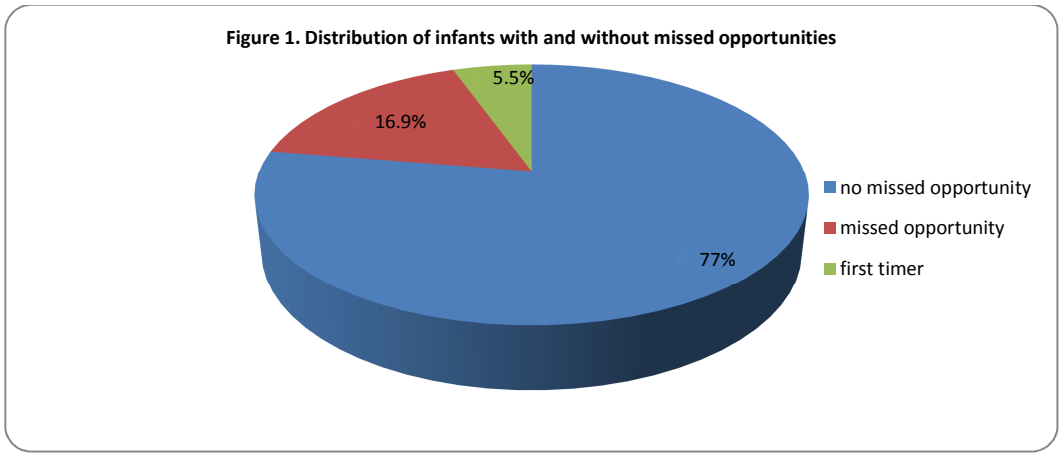
Knowledge	**Number**	**Percentage**
Poor	29	9.45
Average	63	20.52
Good	215	70.03
Total	**307**	**100.00**

Table 4: Source of information about immunization

Source	**Number**	**Percentage**
Antenatal clinic	176	57.33
Media	83	27.04
School	37	12.05
Friends	9	2.93
Church	2	0.65
Total	**307**	**100.00**

Table 5: Perception of respondents about immunization services

Perception	**Number**	**Percentage**
Good	286	93.16
Fair	10	3.26
Poor	5	1.63
No response	6	1.95
Total	**307**	**100.00**



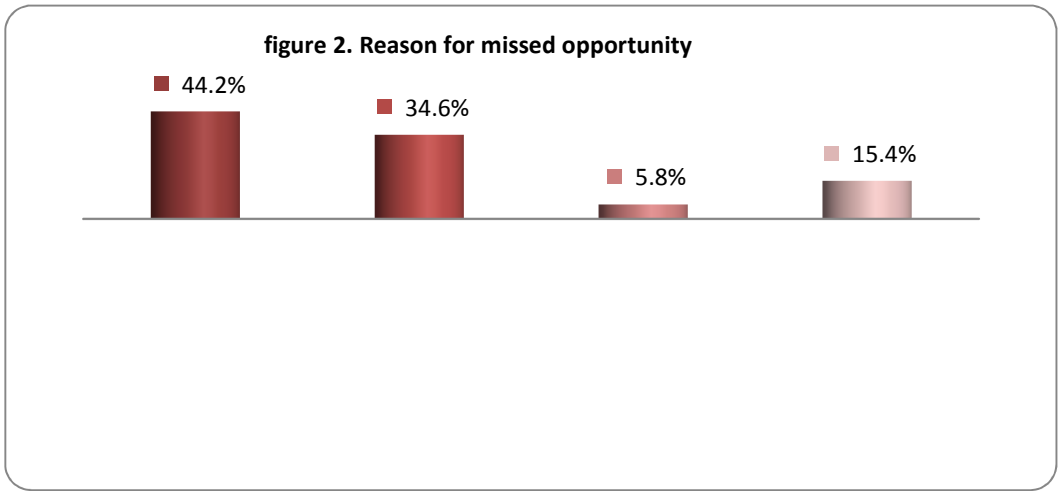


Table 6: Distribution of vaccines missed

Vaccine	Frequency	Percentage
BCG/OPVo	20	38.46
OPV1/HBV1/DPT1	21	40.38
OPV2/HBV2/DPT2	6	11.54
OPV3/HBV3/DPT3	3	5.78
YELLOW FEVER/MEASLES	2	3.84

Table 7: Age comparison of those with and without missed opportunity

Age (years)	Missed opportunity	Without missed opportunity	p-value
≤20	2(3.85)	7(2.94)	0.50
21-30	27(51.92)	137(57.56)	0.46
31-40	21(40.38)	89(37.39)	0.69
41-50	2(3.85)	5(2.11)	0.37

Table 8: Comparison of the educational status of those with and without missed opportunity

Educational status	Missed opportunity	Without missed opportunity	p-value
Primary	4(7.69)	18(7.5)	0.58
Secondary	28(53.85)	138(57.98)	0.58
Tertiary	18(34.61)	78(33.19)	0.84
None	2(3.85)	3(1.27)	0.22

Table 9: Comparison of those with and without missed opportunity according to their knowledge about immunization

Knowledge	Missed opportunity	Without missed opportunity	p-value
Poor	**6 (11.54)**	**20 (8.10)**	**0.47**
Average	**11(21.13)**	**48 (20.17)**	**0.78**
Good	**35 (67.31)**	**170 (71.43)**	**0.55**